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Engineering Reference Manual for Coding NEDS (National Emissions Data System) and EIS/P and R (Emission Inventory Subsystem/Permits and Registration) Forms

(U.S.) Environmental Protection Agency
Research Triangle Park, NC

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Office of Air Quality
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Research Triangle Park NC 27711

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April 1980

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Engineering Reference Manual for Coding NEDS and EIS/P&R Forms

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This manual provides specific engineering guidance and background information for the evaluation and reporting of source/emissions data in NEDS or EIS/P&R format. The manual is designed to assist coders of NEDS and EIS/P&R data who may not be familiar with a wide variety of industrial processes.

It summarizes the purpose and organization of the manual. It also presents general coding instructions to supplement those given in other NEDS and EIS/P&R technical references, and presents general guidance regarding the use of NEDS Source Classification Codes (SCCs).

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
NEDS CDHS EIS/P&R Point Sources Air Pollutants Emissions Coding Forms		

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National Air Data Branch
Monitoring and Data Analysis Division

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air, Noise, and Radiation
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

April 1980

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ENGINEERING REFERENCE MANUAL FOR

CODING NEDS AND EIS/P&R FORMS

Volume I: Introduction

National Air Data Branch
Monitoring and Data Analysis Division

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air, Noise, and Radiation
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Research Triangle Park, North Carolina 27711

April 1980

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SECTION 1

INTRODUCTION

The U.S. Environmental Protection Agency (EPA) maintains computerized systems for receiving, storing, analyzing, and reporting information on sources of air pollution throughout the nation. Pollution sources are classified in two basic categories: 1) "point" sources, such as industrial plants and similar facilities that generate substantial quantities of pollutants, and 2) "area" sources, such as motor vehicles and residences, which are individually rather small sources and are so numerous that they must be considered collectively in an inventory of pollutant emissions. This manual deals only with point sources and with two data systems that report point source information: the National Emissions Data System (NEDS), and the Emission Inventory Subsystem/Permits and Registration (EIS/P&R) of EPA's Comprehensive Data Handling System.

These data systems provide nationwide estimates of pollutant emissions. The data are useful in evaluating the effectiveness of pollution control measures and in planning programs for improving air quality. It is essential, therefore, that the information entered into the data systems is both accurate and complete. The purpose of this manual is to assist the coders of NEDS and EIS/P&R forms in preparing point source data for entry into the systems.

SECTION 2

ELEMENTS OF THE MANUAL

This manual is presented in multiple volumes to facilitate day-to-day use. Volume I consists of introductory material together with supplementary coding instructions (Section 3), and a brief description of the organization of Source Classification Codes (SCC's, Section 4). Volumes II and III consist of compendiums of information concerning some of the major pollutant-emitting processes. Additional volumes covering other processes may be developed in the future. The SCC's and process compendiums are described briefly below.

SOURCE CLASSIFICATION CODES

A facility or plant that constitutes a point source of emissions usually involves several distinct physical operations, such as mixing and grinding, and chemical operations, such as incineration and oxidation. In this manual the term "process" can denote either the total group of operations at a plant (as in the term "sulfuric acid manufacturing process") or a single operation in the overall process (as in the term "oxidation process"). In the interests of clarity, the term "step" is sometimes used for the latter purpose, e.g. "the concentration step in the sulfuric acid manufacturing process." Where it is appropriate, the term "operation" is also used to denote a single phase of the overall process, e.g. "the loading operation in the coal cleaning process."

On the NEDS and EIS/P&R forms, each of these separate operations or processes is identified by an eight-digit code called the Source Classification Code. The SCC's are given in a master list, the AEROS Manual, Volume V, that is continually updated by the EPA.[1] Any user/coder of the EPA data systems can propose an addition to the SCC list for use in identifying some phase of process operations not yet included in the master list. Section 3.1.3 of the AEROS Manual, Volume II, provides guidelines for proposing new SCC's.[2]

The SCC list is divided into two parts. Part I includes processes common to many industries, such as boilers and solid waste disposal facilities. Part II includes SCCs for specific industries. Part II is arranged in order according to Standard Industrial Classification (SIC).

PROCESS COMPENDIUMS

NEDS forms are prepared by a great many persons at diverse levels of technical competence and experience. A coder may be unfamiliar with the industrial or other process for which the forms must be prepared. A major portion of this manual consists of compendiums of information about specific processes. Each compendium presents a brief process description with a process flow diagram, lists the points in the process at which pollutants are emitted, and describes the control measures usually applied by process operators to reduce or eliminate emissions. Each

process compendium gives specific guidance for coding of process and emissions data on NEDS and EIS/P&R forms and shows examples of forms with some of the entries precoded. The compendium also provides a glossary of technical terms commonly used in the process or industry and a list of references to pertinent technical literature.

Referring to a process compendium will aid the coder in determining whether the permit form or other report submitted by the process operator is complete. If it is not, he should contact the responsible plant official to obtain all information that is needed to provide a full description of the plant's operations for coding of NEDS forms.

Omission of information from emissions reports can seriously limit the effectiveness of the data systems. The following example is presented to emphasize the importance of thorough reporting and to illustrate how the coder can use a process compendium to evaluate the information submitted by a process operator. Figure 2-1 shows an emissions report as it was submitted to a local agency by a foundry operator (the name, of course, is changed). The report form is in six sections, each dealing with a different aspect of process operation. Relying on this form as submitted, the coder could enter into the data system information on only one point of emission at the foundry, the cupola. A process flow diagram developed solely on this basis would appear as shown in Figure 2-2.

Date Report Submitted: MAY 8, 1974

ENVIRONMENTAL PROTECTION AGENCY
AIR POLLUTANT EMISSIONS REPORT
SECTION I - GENERAL INFORMATION

FORM APPROVED
OMB NUMBER 158-R76

For Official Use Only:
Date Sent:
Date Returned:
UTM Grid Coordinates:
SIC No.:
Source ID: - -

Plant, institution, or establishment name: JOHN DOE FOUNDRY CO.

Plant, institution, or establishment address: BOX 1 (Street or Box Number) CINCINNATI (City) OHIO (State) 45200 (Zip)

Person to contact regarding this report: R. ROE Title: SR. ENGINEER Telephone:

Mailing address: P.O. BOX 1 (Street or Box Number) CINCINNATI (City) OHIO (State) 45200 (Zip)

Approximate number of employees at plant, institution, or establishment location: ☐ Less than 100 ☑ 100 or more.

Elevation of plant, institution, or establishment in relationship to mean sea level: 600 feet above mean sea level, _____ feet below mean sea level.

Information is representative of calendar year: 1974

Land area at plant location: 2.8 acres. Enclose a sketch of layout if there is more than one building.

Plant location: (give nearest cross streets, describe by landmarks or enclose a map, engineering drawing, or sketch)
"A" ST. & FIRST AVE.

☐ Air pollutants of the type indicated in the instructions for the completion of this report, i.e., _____ are not emitted at this plant, institution or establishment. Therefore, no other Sections of the report need be completed.

_____ (Signed) _____ (Title)

Please return all sections of this report to: _____

Figure 2-1. Form submitted by an operator of a gray iron foundry.

Date Report Submitted: MAY 8, 1974

ENVIRONMENTAL PROTECTION AGENCY
AIR POLLUTANT EMISSIONS REPORT

FORM APPROVED
OMB NUMBER 158-R76

SECTION II - FUEL COMBUSTION FOR GENERATION OF HEAT, STEAM, AND POWER

Plant, institution, or establishment name: JOHN DOE FOUNDRY CO.

Normal operating schedule for fuel use: 3½ Hours per day 5 Days per week 50 Weeks per year 875 Hours per year.

Dates of annually occurring shutdowns of operations: FIRST TWO WEEKS IN JULY. Additional operating information enclosed ☐.

Source[a] Code	Number of Combustion Sources[b] (Boilers)	Size of Unit (Input)[c] 10^6BTU/hr.	Type of Unit[d]	Installation Date[e]	Percent Excess Air Used In Combustion (Design)[e]	Power Output Megawatts[f]
II-A	1-CUPOLA	2 TON OF COKE/HR.		1954	5600 CFM	—

a. List a separate code number to represent each source (e.g., II-a, II-b, II-c, etc.), then enter the same code number and the required data on the continuation of this Section on Page 3, and in Sections V and VI.

b. Multiple sources may be grouped if units are similar in size and type, burn the same fuel, or are vented to the same stack.

c. Nameplate data are sufficient (give rated or maximum capacity, whichever is greater).

d. Hand-fired, underfeed, overfeed, traveling-grate or spreader stoker; cyclone furnace; pulverized, wet or dry bottom with or without fly ash reinjection; rotary or gun type oil burner; etc.

e. List separately future equipment and expected date of installation.

f. Power generation only.

Figure 2-1 (continued). Form submitted by an operator of a gray iron foundry.

Date Report Submitted: MAY 8, 1974

ENVIRONMENTAL PROTECTION AGENCY
AIR POLLUTANT EMISSIONS REPORT

FORM APPROVED
OMB NUMBER 158-R78

SECTION III - COMBUSTIBLE SOLID AND LIQUID WASTES DISPOSAL

Plant, institution, or establishment name: JOHN DOE FOUNDRY CO

Combustible solid and liquid wastes disposed of ☐ on site, ☑ off site, ☐ both on and off site. If off site, location of disposal site and/or name of hauler: ACHG LANDFILL (If disposal of solid and liquid wastes is partly or wholly on site, complete remainder of this page and Sections IV, V and VI; otherwise, skip to Section IV.)

Normal on-site combustion operating schedule: _____ Hours per day _____ Days per week _____ Weeks per year _____ Hours per year.

Seasonal and/or peak operation period: (Specify) _____

Dates of annually occurring shutdowns of operations: _____ Additional operating information enclosed ☐.

Source Code[a]	Waste Material			Method of Disposal[d]	Installation Date	Hourly Burning Rate, lbs.		Auxiliary Fuel Used[e]	Percent Excess Air Used in Combustion (Design)	Future Disposal[f]
	Type[b]	Amount Per Year[c]	Percent Combustible			Average	Maximum			

a. List a separate code number to represent each source (e.g., III-a, III-b, III-c, etc.), then enter required data on this page and for the same code number sources in Section V and VI.
b. Rubbish, garbage, mixed garbage and rubbish, waste paper, wood chips or sawdust, etc.
c. Tons, pounds, or gallons/year.
d. Open burning dump; incinerator, single chamber; etc. (See instructions for examples and use appropriate identification numbers; other non-listed methods, specify.)
e. Indicate whether auxiliary fuel is used in incinerators and pit burning, and the amount.
f. Estimated increase or decrease in combustible solid and liquid wastes disposal rate for the five years after the calendar year for which this report is completed. If increase is due to new equipment, please list this equipment separately.

Figure 2-1 (continued). Form submitted by an operator of a gray iron foundry.

Date Report Submitted: MAY 8, 1974

ENVIRONMENTAL PROTECTION AGENCY
AIR POLLUTANT EMISSIONS REPORT

FORM APPROVED
OMB NUMBER 158-R75

SECTION IV - PROCESS OPERATIONS EMISSIONS

Plant, institution, or establishment name: JOHN DOE FOUNDRY CO

Normal operating schedule: 3.5 Hours per day 5 Days per week 50 Weeks per year 875 Hours per year.

Seasonal and/or peak operation period: NONE

Dates of annually occurring shutdowns of operations: FIRST TWO WEEKS OF JULY. Additional operating information enclosed ☐.

Source Code[a]	Processes or Operations Releasing Pollutants to the Atmosphere[b,c,d]	Date Installation Went on Line	Raw Materials Used for Processes or Operations				Products of Processes or Operations				Intermittent Operation Only: Average Hours/week[h]	Future: Increase or Decrease in Process Rate
			Type	Quantity			Type	Annual Average[f]	Quantity			
				Annual Average[f]	Hourly Process Rate, lbs.				Hourly Process Rate, lbs.			
					Design	Maximum			Design	Maximum		
IV a	CUPOLA	1954	SCRAP IRON	9750 tons	22,285	23,400	GRAY IRON	19000 TONS	19000	10770	—	NONE PLANNED
IV a	CUPOLA	1954	PIG IRON	250 tons	570	600						
IV a	CUPOLA	1954	COKE	1500 tons	3430	3600						
IV a	CUPOLA	1954	LIMESTONE	375 tons	857	900						

a. List a separate code number to represent each source (e.g., IV-a, IV-b, IV-c, etc.) then enter required data on this page and for the same code number sources in Sections V and VI.
b. Multiple sources may be grouped if similar in size and type.
c. Sulfuric acid-contact; aluminum smelting-crucible furnace; cement manufacturing-dry process; etc. (See instruction for examples and use appropriate identification numbers; other non-listed processes and operations, specify.)
d. The pollutants to be covered in this report are listed in the accompanying instructions.
e. Sulfur burned; pig, foundry returns, or scrap aluminum melted; limestone, cement rock, clay, iron ore used; etc.
f. Pounds, tons, gallons, barrels, etc.
g. Sulfuric acid produced; aluminum ingots produced; cement produced; etc.
h. For intermittent processes, indicate average number of hours per week of operation so that estimates of yearly emissions may be obtained.
j. Estimated percent increase or decrease in process rate on a total plant basis for the five years after the calendar year for which this report is completed. If increase is due to new equipment, please list this equipment separately.

Figure 2-1 (continued). Form submitted by an operator of a gray iron foundry.

Date Report Submitted: MAY 8, 1974

ENVIRONMENTAL PROTECTION AGENCY
AIR POLLUTANT EMISSIONS REPORT

FORM APPROVED
OMB NUMBER 158-R78

SECTION V - AIR CLEANING EQUIPMENT

Plant, institution, or establishment name: JOHN DOE FOUNDRY CO

Source Code[a]	Type of Air Cleaning Equipment[b,c]	Installation Date[c]	Pollutant Removed[c,d]	Efficiency[e]		Inlet Gas Temperature, °F	Inlet Gas Flow Rate,[f] CFM	Exit Gas Pressure, PSI
				Design Percent	Operating Percent			
V-a	VENTURI	OCT. 1971	PARTICULATE			1200°F	53,000 CFM	

a. List code numbers corresponding to each emissions source reported in Sections II, III, and IV.
b. Wet scrubber, electrostatic precipitator, fabric filter, etc. (See instructions for examples and use appropriate identification numbers; other non-listed type, specify.)
c. Please list future equipment separately.
d. The pollutants to be covered in this survey are specified in the accompanying instructions.
e. Give efficiency in terms of pollutant removed.
f. At actual flow conditions.

Figure 2-1 (continued). Form submitted by an operator of a gray iron foundry.

Date Report Submitted: MAY 8, 1974

ENVIRONMENTAL PROTECTION AGENCY
AIR POLLUTANT EMISSIONS REPORT

FORM APPROVED
OMB NUMBER 158-R73

SECTION VI - STACK AND POLLUTANT EMISSIONS DATA

Plant, institution, or establishment name: JOHN DOE FOUNDRY CO

STACK DATA							ESTIMATE OF POLLUTANT EMISSIONS[d]			
Source Code[a]	Height Above Grade ft.	Inside Diameter at Top, ft.	Exit Gas Velocity,[b] ft./sec.	Exit Gas Temperature,[b] °F	Exit Gas Flow Rate, CFM[c]		Pollutants	Quantity		
					Average	Maximum		Tons Per Year	Lbs. Per Hour	
									Average	Maximum
VI-a	100	5.0					PARTICULATE			
							SULFUR DIOXIDE			
							HYDROCARBONS			

a. List code numbers corresponding to each emissions source reported in Sections II, III, and IV.
b. Values should be representative of average flow conditions for hours of operation.
c. At actual flow conditions.
d. The pollutants to be covered in this survey are specified in the accompanying instructions.
e. Give stack test data if available (indicate stack sampling method used), otherwise, specify basis used. If unknown, please do not complete these columns.

Figure 2-1 (continued). Form submitted by an operator of a gray iron foundry.

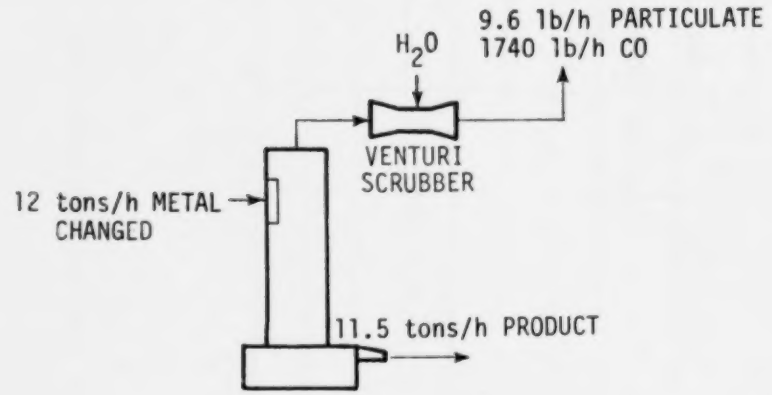


Figure 2-2. Process flow/emissions diagram developed from information reported in Figure 2-1.

Because the report submitted by the foundry gives no information on quantities of emissions, the values shown on the process flow diagram are calculated from the reported process rate by the use of an emission factor and an assumed value for efficiency of the venturi scrubber. Consulting the process compendium for a gray iron foundry, the coder will find that it describes emissions from the cupola and other operations such as the core oven, pouring, shakeout, grinding, and combustion of in-process fuel. The compendium presents a much more detailed process flow diagram of typical foundry operations, as shown in Figure 2-3. With this understanding of typical foundry operations and their points of emission, the coder can contact the foundry operators regarding their emissions report and request the specific information needed to complete it.

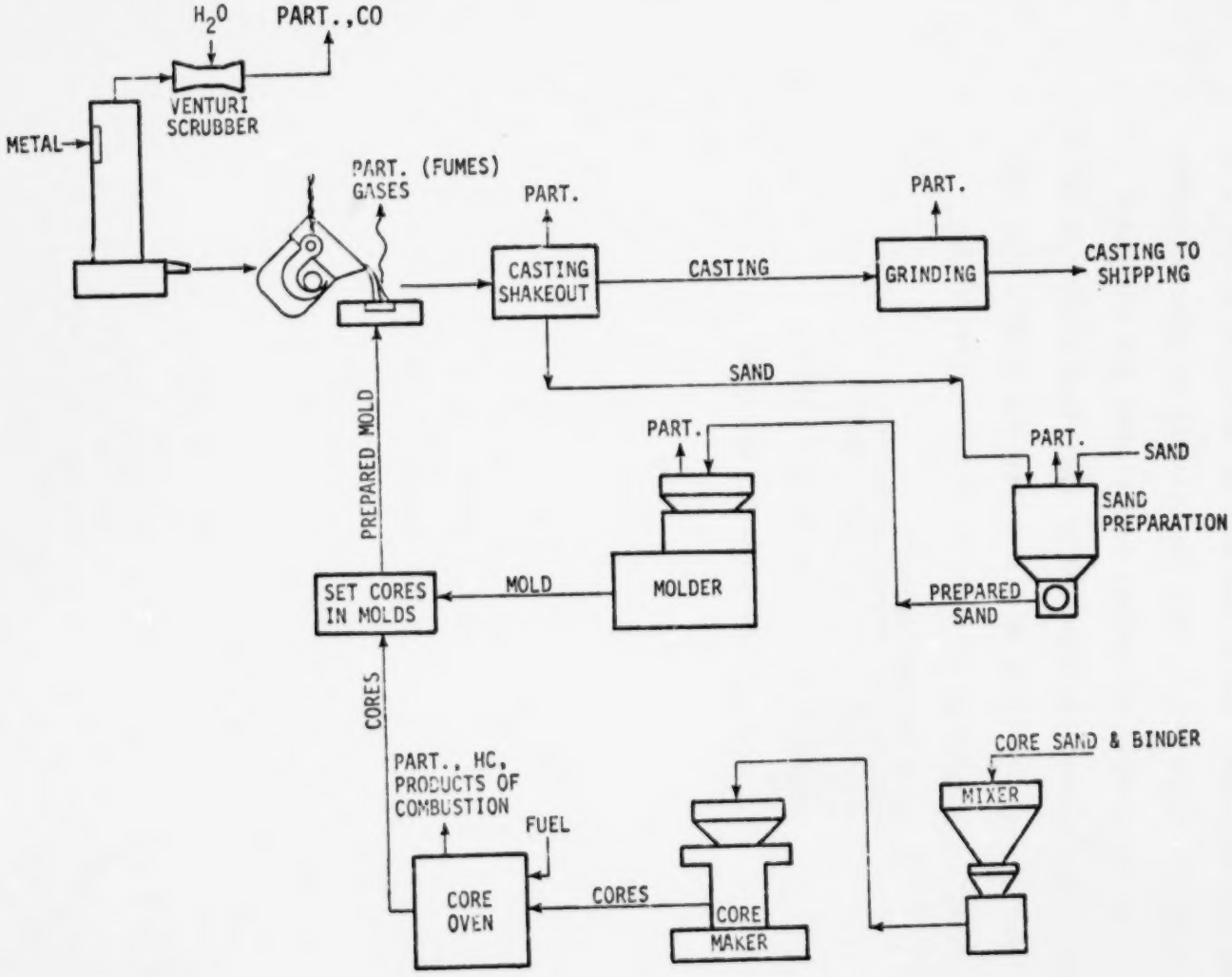


Figure 2-3. Operations in a typical foundry.

UPDATING AND EXPANDING THE MANUAL

Preparation of process compendiums is a continuing process, and it is expected that additional compendiums will be issued periodically in sets. In addition, there will be need for updating of certain process descriptions as new process and control technologies are introduced. All volumes of this manual are presented in loose-leaf binders to facilitate the insertion of current materials as they are issued. Any comments or suggestions regarding this manual should be directed to:

NEDS Project Manager
Requests & Information Section
National Air Data Branch (MD-14)
U.S. EPA
Research Triangle Park, N.C. 27711.

Phone: 919-541-5395 (FTS 629-5395).

REFERENCES

1. AEROS Manual Series Volume V: AEROS Manual of Codes. U.S. Environmental Protection Agency, Research Triangle Park, North Carolina. Publication No. EPA-450/2-76-005. April 1976.

2. AEROS Manual Series Volume II: AEROS User's Manual. U.S. Environmental Protection Agency, Research Triangle Park, North Carolina. Publication No. EPA-450/2-76-029. December 2, 1976.

SECTION 3

CODING INSTRUCTIONS

The coding instructions presented here supplement those in the Guide for Compiling a Comprehensive Emission Inventory, (APTD-1135), in AEROS Volume II, and in the EIS/P&R guide. These instructions present practical solutions to many of the common problems encountered in preparing input data on industrial processes.

In coding of NEDS or EIS/P&R forms, the following references should be readily available:

- Guide for Compiling a Comprehensive Emission Inventory, APTD-1135, March 1973.
- AEROS Manual Series, Volume II, EPA-450/2-76-029, December 1976. (plus updates).
- AEROS Manual Series, Volume V, EPA-450/2-76-005, April 1976. (plus updates)
- Comprehensive Data Handling System (CDHS), Emissions Inventory Subsystem Program Documentation and Users Guide, EPA-450/3-74-045.a, February 1975.
- Compilation of Air Pollutant Emission Factors, AP-42, Third Edition, August 1977. (plus supplements).
- Standard Industrial Classification Manual, 1972. U.S. Gov't Printing Office Stock No. 4101-0066.
- USGS Topographic Quadrangle Maps, 7.5' series with UTM grid tick markings. (If 7.5' series is not available, 15' series may be used.)

DEFINITION OF A POINT SOURCE

A production, commercial, or storage facility may discharge pollutants to the atmosphere through stacks or vents or from unconfined areas. When emissions of criteria pollutants from a facility are significant, the facility is referred to as a point source. EPA regulations, as set forth in the Federal Register (Vol. 44, No. 92, May 10, 1979) prescribe that States shall report to EPA in NEDS format on all facilities annually emitting more that 90.7 metric tons (100 tons) of particulates, sulfur dioxide, nitrogen dioxide, or hydrocarbons or more than 907 metric tons (1000 tons) of carbon monoxide. Point sources may also include sources, regardless of emissions, that are included in a comprehensive permit or registration system already maintained by an agency.

Emissions and process data for a point source are coded on one or more NEDS forms. In the following discussion, the words facility, plant, establishment, and point source are used synonymously.

CODING NEDS FORMS

All operations at the plant should be depicted in a process flow diagram. An example of such a flow diagram is given in Figure 3-1. The facility reporting the data usually can provide a flow diagram. If an adequate diagram is not available, the coder should first become familiar with the general process, then develop a diagram based on the information furnished in the

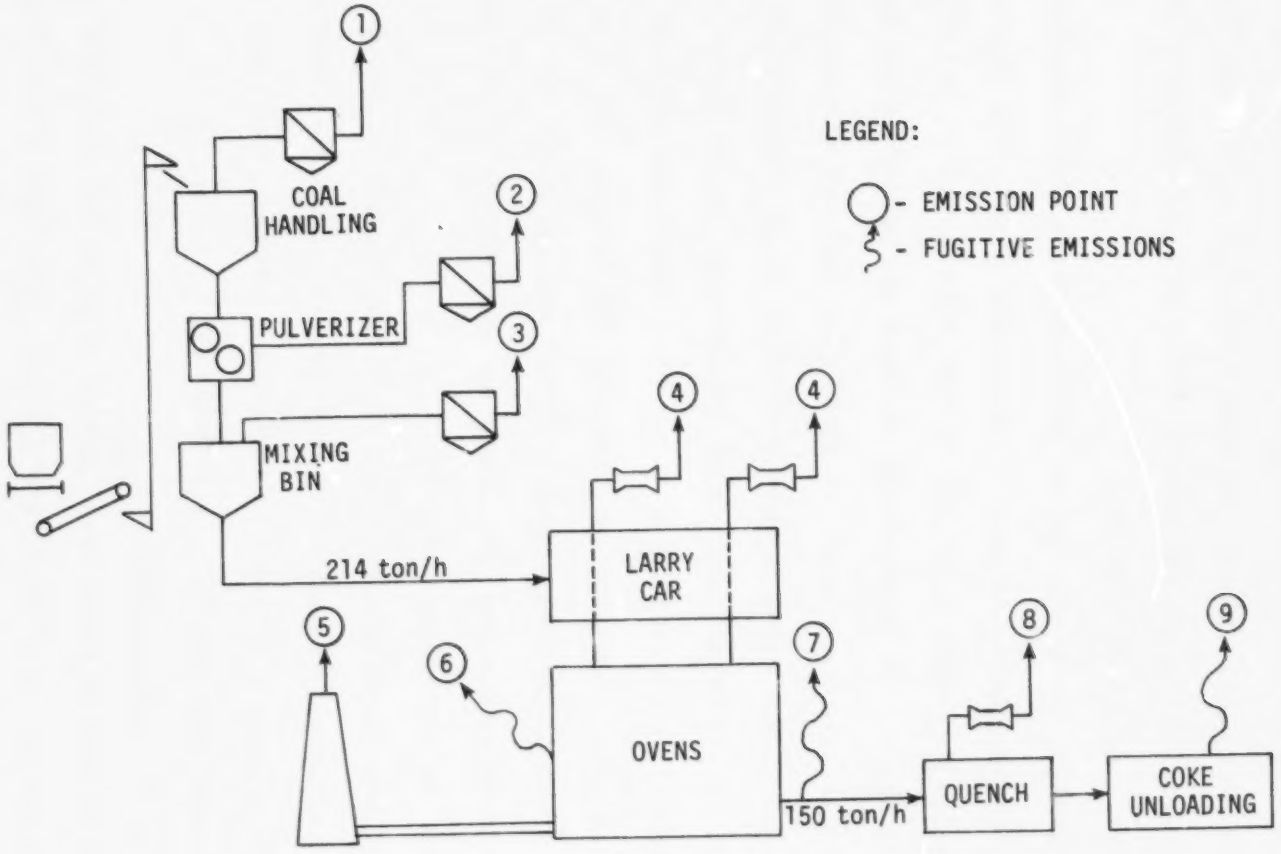


Figure 3-1. Typical process flow diagram.

plant's report. The diagram helps in identifying the operations, discharge points or stacks, and control devices. For ready reference, a diagram may be drawn on the back of one of the NEDS forms. Where a large plant has many points of pollutant discharge, several diagrams depicting different portions of the process flow may be convenient.

The NEDS form identifies an activity at a point source and presents process data, emissions data, and stack data pertaining to that activity. The activity is referred to as an emission point or source. An emission point does not necessarily represent a single process vessel or operation and the stack associated with it. Depending on the magnitude of emissions and the arrangement of process vessels or operations, an emission point may represent an operation, a group of operations, or even a part of an operation. For example, a power plant with one large boiler and two relatively small boilers may be coded on two NEDS forms: one representing the large boiler and the other representing the two smaller boilers.

Sometimes an emission point that may be one of several emission points at the point source is also loosely referred to as a point source. In this discussion, however, the term "point source" refers exclusively to a facility.

Definition of Coding Terms

As with any computerized system, inputs for the NEDS system must be prepared in a specified format. The NEDS Point Source form, shown in Figure 3-2, is used to prepare inputs for the system.

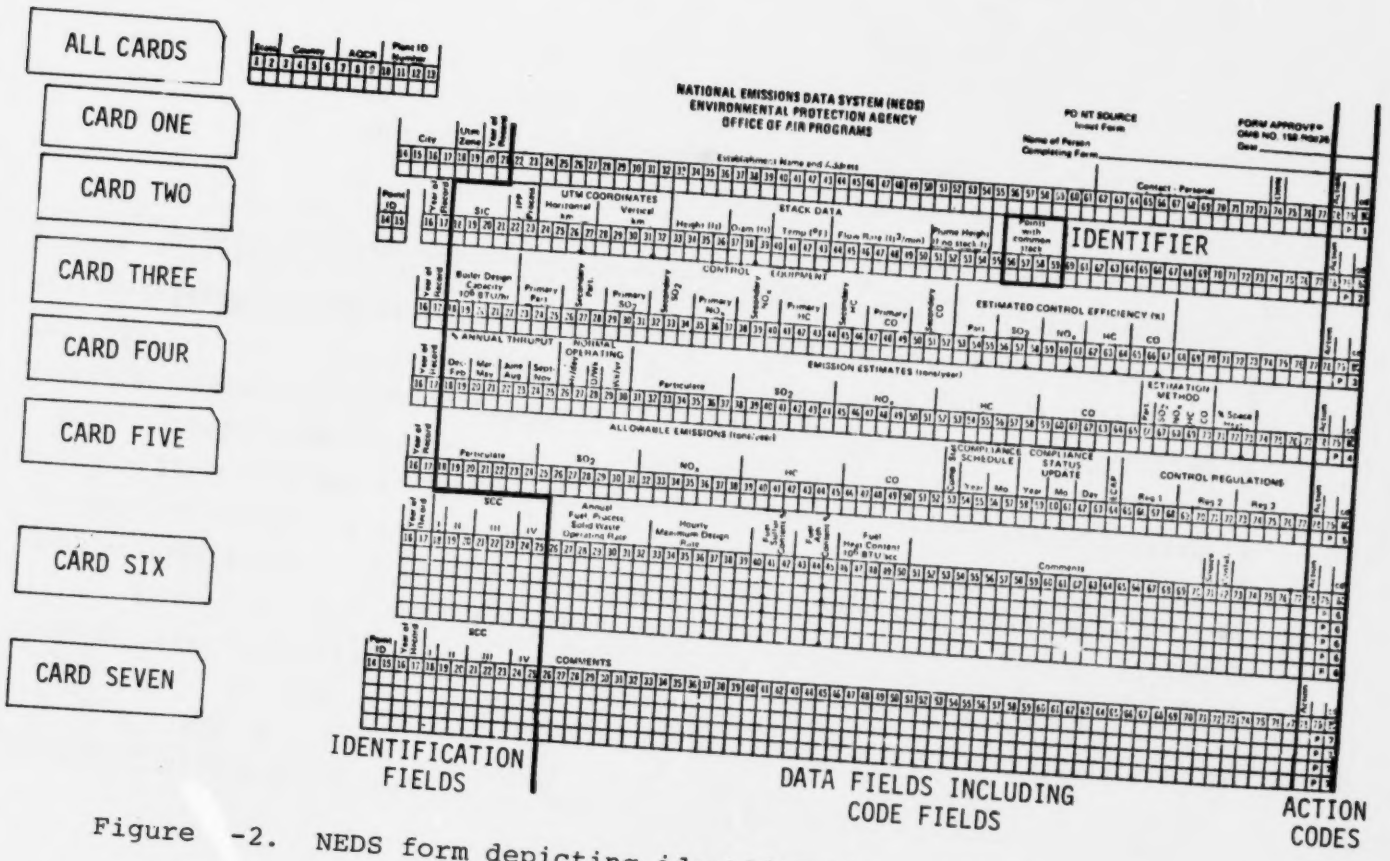


Figure -2. NEDS form depicting identification, control action, and data fields.

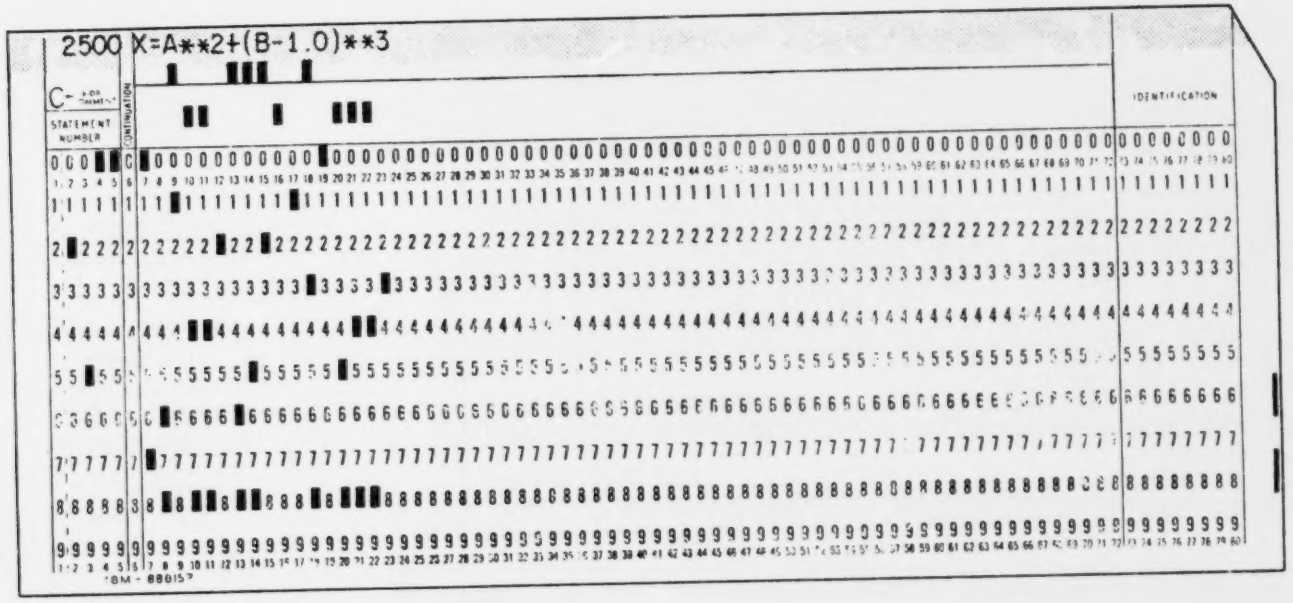


Figure 3-3. A typical computer card.

Two key terms used frequently in coding instructions are "card" and "field." These are defined as follows:

Card - See Figure 3-3. A computer card is punched on a keypunch machine to prepare inputs that a computer can "read." The card has columns numbered 1 through 80. When a card is keypunched, each of these columns represents a character - alphabetical, numerical, mathematical, or other - or it may be left blank. Only specified characters can be used. Typically, cards are prepared from forms designed to fill in 80 characters in 80 boxes arranged in a horizontal line. This line is referred to as a card, and the boxes are referred to as columns.

Field - A field is a column or a group of columns designated to represent a particular parameter. The parameter the field represents is labeled on the NEDS form; there are some blank fields also. No entries are to be made in columns that have no data parameter description on the form.

In some fields, only numeric entries are allowed. Numeric entries may be integers or numbers with a decimal point. Where numbers with a decimal point are used, the decimal point is indicated by a preprinted triangle in the field (see Figure 2-1). When filling in such a field, the entry is positioned on the field so that the decimal point falls on the triangle. The columns right of the decimal point must be filled out completely. For example, numbers 352, 352.8, 352.8729 and 0.5 should be entered as shown in Figure 3-4.

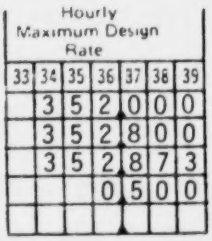


Figure 3-4. Integar and decimal entries in a field with preprinted decimal point.

Integer entries must be right-justified, i.e. the entry is positioned flush with the right end of the field. An example is shown in Figure 3-5.

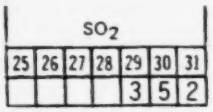


Figure 3-5. Entry in an integar field.

Aeros Vol. II gives detailed coding instructions. The following is a brief description of the NEDS form, included here to prepare the coder for a more detailed discussion of items not fully covered in AEROS Vol.II or other references.

The NEDS form includes seven rows of information, labeled 1 through 7 on the right side of the form. Rows 1 through 5 consist of information for a single computer card; Rows 6 and 7 provide data for five and four cards, respectively. Each row has several information fields consisting of one or more columns. Note that Columns 1 through 13 are common for all the cards on the form. Since the fields on each card in Rows 6 and 7 are identical, the terms "rows" and "cards" are used interchangeably; for example, Row 7 may be referred to as Card 7.

The information fields on the coding form are of three categories: identifying fields, input action code fields, and data fields. Figure 3-2 depicts these categories. The identifying fields designate the plant, geographical location, date of record, emission point, and process and indicate whether the emission point discharges through a common stack (shared with

other emission points). Columns used for the identification fields are listed below. None of these columns may be left blank. Thus, the plant ID's are 0001, 0002, and so on.

Card No.	Columns (inclusive)
	No blanks allowed
1	1 to 13 + 14 to 21
2	1 to 13 + 14 to 17 + 56 to 59
3	1 to 13 + 14 to 17
4	1 to 13 + 14 to 17
5	1 to 13 + 14 to 17
6	1 to 13 + 14 to 17 + 18 to 25
7	1 to 13 + 14 to 17 + 18 to 25

There is one exception to the specification of no blanks in the identifying fields: the City Code on Card 1, Columns 14-17. If the point source is outside the city limits, or if the city is not listed in SAROAD Station Coding Table, AEROS Manual Volume V, leave Columns 14-17 blank.

Each card has one input action field, Column 78. Columns 79 and 80 are prefilled on the form. Depending on whether information is added to the system, or information already in the system is changed or deleted, A, C, or D is entered in Column 78. No blanks are allowed in these columns.

Fields having no labels must be left blank. The remaining fields are data fields. Some data fields are code fields, i.e. there are prescribed codes for these fields and only a prescribed code may be used; codes are found in AEROS, Volume V. For example, the Source field (Card 6, Column 71) indicates whether the activity unit is a boiler, incinerator, other combustion

unit, or other process. Specific supplemental procedures for some fields are described below.

Card 1

Only one Card 1 needs to be filled out for a plant (point source). Columns 1 through 13 are common to all cards on the NEDS form; they identify the plant and must be filled out on all forms.

State, county and AQCR codes must be obtained from AEROS Volume V. A selected number of independent cities may be treated as county equivalents for coding purposes. These are identified in AEROS Volume V, Section 2.6.

Card 2

Emission points in a plant are numbered sequentially 01, 02, and so on. Stack data for each point are reported on Card 2.

Any operation emitting 5 tons or more per year of any of the criteria pollutants should be reported on a separate coding form. Operations emitting less than 5 tons of any criteria pollutant may be grouped into one effective source and reported on one coding form. Within a facility, an operation that emits less than 1 ton per year of any pollutant and that cannot be combined with like small sources normally is not reported on a coding form. Guidelines for combining sources are presented in the AEROS Manual, Volume II. The determination of whether to group or not to group operations requires exercise of judgement. When the

combined operations do not discharge through a common stack, data for a representative stack can be determined by use of the formula in the AEROS Manual, Volume II.

Card 3

In estimation of control efficiencies, engineering knowledge of control systems performance will indicate whether a given control device significantly reduces the emissions of more than one pollutant. For example, a power plant boiler may be equipped with two control devices: an electrostatic precipitator to remove particulates and a packed-bed scrubber, following the precipitator, to remove sulfur dioxide. Although the scrubber does remove some particulates, its efficiency in this removal is essentially zero.

If E_1 is the fractional efficiency of the primary control device and E_2 the efficiency of the secondary device in series, the combined fractional efficiency, E, of these two devices can be calculated as follows:

$$E = 1 - (1 - E_1)\ (1 - E_2)$$

Card 4

The emission factor represents an average rate of emissions of a pollutant as a result of an activity. For example, when several similar pulverized-coal-fired boilers are tested for particulate emissions, an average rate of emission for this type of boiler can be calculated. Although emissions factors have been developed for many processes (sources), many other emission factors are still being developed. Where factors are not pro-

vided, emission rates may be estimated by use of emission factors for similar processes. For example, emissions from a natural-gas-fired space heater may be calculated from the emission factors given for a small natural-gas-fired boiler. The estimation code in such cases is 4.

Card 5

In calculation of allowable emissions, the applicable regulations must be followed carefully. Many state regulations pertaining to fuel firing are based on the total heat input at an installation. In such a case, allowable emissions per unit heat input for a power plant having four boilers, each rated at 250 million Btu/hr, will be calculated on the basis of 1000 million Btu/hr as the heat input and not 250 million Btu/hr. Similarly, regulations pertaining to some noncombustion processes may be based on the total capacity of similar process units at the plant and not on the capacity of individual units.

Some regulations may be based on a specific condition of exhaust gases. For example, carbon monoxide regulations may be based on 12 percent carbon dioxide in the exhaust gases. Allowable emissions under such regulations should be calculated carefully.

Card 6

Columns 1 through 13 identify the plant; columns 14 and 15 on Cards 2 to 7 identify the emission point; and columns 18 through 25 on Card 6 (and 7), the SCC field, identify the process. A NEDS form reports data for only one emission point,

and one or more SCC's may be required to describe the emission point. More information on SCC's is given in Section 4.

A maximum of 10 SCC's may be recorded for any emission point. All of these must be unique; that is duplication of the same SCC for a specific emission point is not allowed. Since only 5 card 6's are printed on a NEDS form, if more than 5 card 6's are required use an additional NEDS form with the same plant and point identifiers. Cross out cards 1-5 on the form if necessary, to clearly indicate that only card 6's are to be keypunched.

By convention, SCCs representing inprocess fuel use (390-SCCs) have no emissions associated with them. These SCCs can be used only with another associated process SCC at the same emission point.

The operating rate and maximum design rate fields require careful attention. The maximum rate indicates the capacity for which the equipment is designed or the maximum rate at which the equipment may be operated. In normal operation, the equipment may function at, say, 60 percent of the maximum capacity. Where accurate data on normal hourly operating rate and normal operating schedule are available, the annual operating rate may be estimated.

Data on average heat content of the fuel are sometimes used when specific values are not available. The following are typical values for gaseous and liquid fuels:

Fuel	Heat value
Natural gas	1000 Btu/ft^3
Coke-oven gas	550 Btu/ft^3

Fuel (continued)	Heat value (continued)
Distillate oil	140 x 10^6/Btu/1000 gal
Residual oil	150 x 10^6/Btu/1000 gal

Card 7

When comments are being written for a particular process, (SCC), the SCC field must be filled out. An SCC code can be used only once. If additional space is required, one additional Card 7 without SCC may be used for the emission point.

CODING EIS/P&R FORMS

Coding of EIS/P&R forms is very similar to coding of NEDS forms. Detailed coding instructions are provided in the Comprehensive Data Handling System, Users Guide (Reference 4).

The EIS/P&R form contains more fields than the NEDS form. Two of the additional fields are those for the Basic Equipment Code (BEC) and the Pollutant ID. The BEC's are listed in the Air Pollution Manual of Coding, PHS No. 1756 (Reference 6).

Pollutant codes for the five criteria pollutants are:

11101 - Particulate

42401 - Sulfur oxides

42602 - Nitrogen oxides

43101 - Hydrocarbons

42101 - Carbon monoxide

These are the only codes that identify the five criteria pollutants in NEDS. When an agency wishes to use other pollutant codes in EIS/P&R, these must be used in addition to, rather than in place of, the ones listed above.

REFERENCES

1. AEROS Manual Series Volume II: AEROS User's Manual. U.S. Environmental Protection Agency, Research Triangle Park, North Carolina. Publication No. EPA-450/2-76-029. December 2, 1976.

2. AEROS Manual Series Volume V: AEROS Manual of Codes. U.S. Environmental Protection Agency, Research Triangle Park, North Carolina. Publication No. EPA-450/2-76-005. April 1976.

3. Comprehensive Data Handling System (CDHS), Emissions Inventory Subsystem User's Guide. U.S. Environmental Protection Agency, Research Triangle Park, North Carolina. EPA-450/3-74-045-a. February 1975.

4. Compilation of Air Pollutant Emission Factors, Third Edition, Includes Supplements 1-7. U.S. Environmental Protection Agency, Research Triangle Park, North Carolina. Publication No. AP-42. August 1977.

5. Standard Industrial Classification Manual, 1972. U.S. Office of Management and Budget, Office of Statistical Standards. Washington, D.C. 1972.

6. Air Pollution Manual of Coding. U.S. Dept. of Health, Education, and Welfare. PHS Publication No. 1756. 1968.

SECTION 4

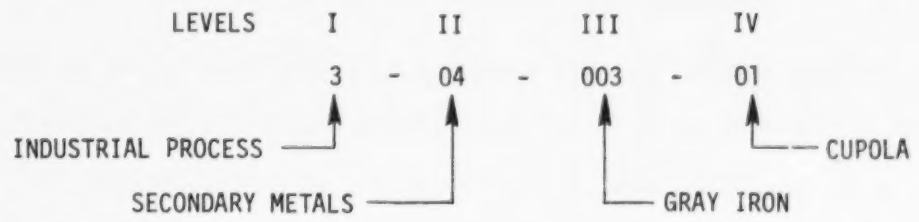
ORGANIZATION OF THE SCC LIST

A brief description of the organization of SCC codes is presented here. The SCC is divided into four levels of identification: Levels I, II, III, and IV, consisting of one, two, three, and two digits, respectively. Level I identifies the category of the process as follows:

Code No.		Process Category
1	-	External combustion sources - identifying different types of boilers and space heaters.
2	-	Internal combustion sources - identifying turbines and reciprocating engines.
3	-	Industrial processes - all processes other than evaporation sources and combustion sources for generation of steam and power or disposal of solid waste.
4	-	Evaporation sources - including surface coating operations, petroleum storage and marketing facilities, and printing presses.
5	-	Solid waste disposal by incineration of wastes.
6	-	Miscellaneous - at this time, only nonemitting Federal sources are grouped in this classification.

The second level of identification signifies the major industry group. Industrial processes are subdivided into chemical manufacturing, food/agricultural, primary metals, and so on. The third level, depending on the process category and the

industry group, indicates the major product, raw material, fuel, or equipment. The fourth level of classification identifies different operations at the point source. As an example, the classification of the SCC for a gray iron cupola is as follows:



The SCC listing as given in AEROS Volume V, Section 3.7 is divided into two parts. Part I includes SCC's common to a wide variety of industrial activities (except for electric utility boilers, SIC 4911, and municipal refuse disposal, SIC 4953, which relate to specific SIC categories). Part I covers all processes related to fuel combustion, solid waste disposal, and general use of organic solvents in degreasing and surface coating operations. Part II identified SCC's relating to specific industrial processes. Part II is arranged in order according to SIC. The major group is indicated at the top of each page. Specific SIC's and SCC's are indicated in order by SIC. In some cases, an SCC or set of SCC's may be commonly associated with more than one SIC. In these cases, multiple SIC codes are indicated with the source category name.

The SIC Manual includes alphabetic indexes of manufacturing and non-manufacturing industries. These indexes may be used as auxilliary guides in identifying proper SIC, and then in locating appropriate SCCs in the SCC

listing. In cases where a process occurs in a number of industries with different SICs, the SCCs appear in the listing under the SIC which most commonly or most properly includes the process. Processes which occur both in manufacturing and nonmanufacturing industries as defined in the SIC Manual, are generally included in the SCC listing under the appropriate manufacturing industry SIC (SICs 20-39).

When the term "General" appears for an SCC process description, this implies definition of a specific process in overall terms, that is without regard to individual stack or other sources of emissions that may exist within the process. Such SCC's provide identification of processes as a simplified "black box" rather than a complex assortment of related emissions sources. Normally, general SCC's are replaced by more specific SCC's when more detailed information about the process is known. Accurate representation of control equipment that may be applicable to only part of a process is difficult if a general SCC is specified. General and specific SCC's should not be used together to represent the same process, since this may cause emissions to be duplicately calculated.

The term "Other/Not Classified" for an SCC process description implies that this code should be used to represent process activities that may exist, but for which no specific SCC's have been defined. Normally, other/not classified SCC's end with -99. A comment, using either NEDS card 6 or card 7 SCC comment cards, should be specified to identify the process activity. Only other/not classified SCC's that appear in the listing should be used. Specification of improper other/not classified SCC's will cause data to be rejected in the NEDS edit process.

Each SCC defines specific units for NEDS annual operating rate and hourly maximum design rate fields. Data entered in these fields must be in the defined SCC units.

Each SCC also includes a set of emission factors. Where flags 'S' or 'A' indicating fuel sulfur or ash content are specified, the appropriate sulfur or ash value from source data is accessed as part of the emission factor, i.e. "17A" indicates 17 times ash content is used as the emission factor. The units of the emission factors are all expressed in pounds per unit of process activity as defined by the SCC. In NEDS, the emission factors will be accessed by the emission calculation program to calculate emissions whenever the emissions estimation method code is 3 or blank. Other estimation method codes cause emissions estimates supplied by the user to be used in place of computer calculated emissions or cause emissions to be calculated as zero. An emission factor value of zero implies no emissions and emissions will always be calculated as zero regardless of what emission estimation method code is indicated. An emission factor value of blank implies that emissions are unknown. If an estimation method of 3 or blank is indicated, and the emission factor is blank, emissions will be calculated as zero.